

Project name

Good Hope Hospital

As built

Date: Tue Feb 15 23:14:58 2011

Administrative information

Building Details

Address: BLOCK 70, SUTTON COLDFIELD, B75 7RR

Certification tool

Calculation engine: Apache

Calculation engine version: 6.1.1.1

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 6.1.1.1

BRUKL compliance check version: v3.5.b.0

Owner Details

Name: Heart of England NHS Trust

Telephone number:

Address: Rectory Road, Sutton Coldfield, B75 7RR

Certifier details

Name: Capita Symmonds

Telephone number: 01527 59400

Address: 3 Centech Technology Park, Fringe Meadow Road, North Moons Moat., Redditch, B98 9NR

Criterion 1: Predicted CO2 emission from proposed building does not exceed the target

1.1	Calculated CO2 emission rate from notional building	69.1 KgCO2/m2.annum
1.2	Improvement factor	0.2
1.3	LZC benchmark	0.1
1.4	Target CO2 Emission Rate (TER)	49.9 KgCO2/m2.annum
1.5	Building CO2 Emission Rate (BER)	49.3 KgCO2/m2.annum
1.6	Are emissions from building less than or equal to the target?	BER =< TER
1.7	Are as built details the same as used in BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and the building services systems should be no worse than the design limits

2.1 Are the U-values better than the design limits? **Better than design limits**

Element	U _a -Limit	U _a -Calc	U _i -Limit	U _i -Calc	Surface where this maximum value occurs*
Wall**	0.35	0.26	0.7	0.28	10010001:Surf[1]
Floor	0.25	0.2	0.7	0.2	CPBR0000:Surf[0]
Roof	0.25	0.19	0.35	0.2	10050001:Surf[0]
Windows***, roof windows, and rooflights	2.2	1.9	3.3	1.9	10010001:Surf[0]
Personnel doors	2.2	0	3	0	No Personnel doors in building
Vehicle access & similar large doors	1.5	0	4	0	No Vehicle access doors in building
High usage entrance doors	6	0	6	0	No High usage entrance doors in building
U _a -Limit = Limiting area-weighted average U-values [W/(m2K)] U _a -Calc = Calculated area-weighted average U-values [W/(m2K)]			U _i -Limit = Limiting individual element U-values [W/(m2K)] U _i -Calc = Calculated individual element U-values [W/(m2K)]		
* There might be more than one surface exceeding the limiting standards.					
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standards are similar to those for windows.					
*** Display windows and similar glazing are not required to meet the standard given in this table.					

2.2 Is air permeability no greater than the worst acceptable standard? No greater than worst acceptable standard

Air Permeability	Worst acceptable standard	This building (Design value)
m3/(h.m2) at 50 Pa	10	7.8

2.3 Are all building services standards acceptable?

2.3a-1 09. Radiant Panel and Nat Vent

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1

2.3a-2 02. Air Distriburion (AHU1)

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1
Efficiency check	Limiting Cooling Nominal efficiency	This building
Cooling efficiency	2.25	3.08
Efficiency check	Limiting Specific Fan Power	This building
SFP	2.5	2.4

2.3a-3 05. Isolation Mech Vent (AHUs 3)

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1
Efficiency check	Limiting Specific Fan Power	This building
SFP	1.8	1.18

2.3a-4 04. Isolation Mech Vent (AHUs 2)

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1
Efficiency check	Limiting Specific Fan Power	This building
SFP	1.8	1.42

2.3a-5 01a. Active Chilled Beams (AHU1)

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1
Efficiency check	Limiting Cooling Nominal efficiency	This building
Cooling efficiency	2.25	3.08
Efficiency check	Limiting Specific Fan Power	This building
SFP	2.5	2.4

2.3a-6 06. Radiant Panel and Mech Vent (AHU1)

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1

2.3a-7 10. Radiators and Nat Vent

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1

2.3a-8 01b. Active Chilled Beams (AHU4)

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1
Efficiency check	Limiting Cooling Nominal efficiency	This building
Cooling efficiency	2.25	3.08
Efficiency check	Limiting Specific Fan Power	This building
SFP	2.5	2.5

2.3a-9 07. Radiant Panel and Mech Vent (AHU4)

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1

2.3a-10 03. Air Distriburion (AHU4)

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1
Efficiency check	Limiting Cooling Nominal efficiency	This building
Cooling efficiency	2.25	3.08
Efficiency check	Limiting Specific Fan Power	This building
SFP	2.5	2.5

2.3a-11 08. Radiant Panel and Mech Vent (AHU5)

HVAC system standard is acceptable

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1

Efficiency check	Limiting heat source seasonal efficiency	This building
Heat source efficiency	Limiting heat source efficiency not specified	1

2.3b- "No HWS in project, or hot water is provided by HVAC system"

2.4	Does fixed internal lighting comply with England and Wales Building Regulations Part L paragraphs 49 to 61?	Separate submission
2.5	Are energy meters installed in accordance with GIL65?	Separate submission

Criterion 3: The spaces in the building without air-conditioning have appropriate passive control measures to limit the effects of solar gains

3.1	Method of showing compliance with England and Wales Building Regulations Part L in paragraph 64?	Separate submission
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Criterion 4: The performance of the building, as built, is consistent with the BER

4.1	Have the key features of the design been included (or bettered) in practice?	Separate submission
4.2	Is the level of thermal bridging acceptable?	Separate submission
4.3	Has satisfactory documentary evidence of site inspection checks been produced?	Separate submission

4.4 Design air permeability

Air Permeability	Worst acceptable standard	This building (Design value)
m ³ /(h.m ²) at 50 Pa	10	7.8

4.5	Has evidence been provided that demonstrates that the design air permeability has been achieved satisfactorily?	Separate submission
4.6	Has commissioning been completed satisfactorily?	Separate submission
4.7	Has evidence been provided that demonstrates that the ductwork is sufficiently airtight?	Separate submission

Criterion 5: Providing information

5.1	Has a suitable building log-book been prepared?	Separate submission
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Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area (m2)	6798	6798
External area (m2)	7180	7180
Weather	BIR	BIR
Infiltration (m3/hm2 @ 50Pa)	8	10
Average conductance (W/K)	2179.72	5195.59
Average U-value (W/m2K)	0.3	0.72
Alpha value (%)	11.53	10

Building Use

% area	Building Type
	Office
	Primary school
	Secondary school
	Further education universities
	Primary health care buildings
	Nursing residential homes and hostels
100	Hospital
	Hotel
	Restaurant/public house
	Sports centre/leisure centre
	Sports ground arena
	Retail
	Warehouse and storage
	Theatres/cinemas/music halls and auditoria
	Social clubs
	Community/day centre
	Libraries/museums/galleries
	Prisons
	Emergency services
	Crown and county courts
	Airport terminals
	Bus station/train station/seaport terminal
	Workshops/maintenance depot
	Telephone exchanges
	Industrial process building
	Launderette
	Dwelling
	Retail warehouses
	Miscellaneous 24hr activities

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Active chilled beams, [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	36.7	211	11.1	17	22.9	0.91	3.45	1	4.15
Notional	117.3	215.4	39.2	35.8	53.1	0.83	1.67	----	----
[ST] Constant volume system (fixed fresh air rate), [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	7	184.3	1.5	25.3	180	1.28	2.03	1	4.15
Notional	93.7	248.8	31.4	41.4	64	0.83	1.67	----	----
[ST] Central heating using water: radiators, [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	21.6	0	6.4	0	22.3	0.94	0	1	0
Notional	98.4	0	35.1	0	16.5	0.78	0	----	----
[ST] Central heating using water: radiators, [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	51.1	0	15.1	0	29.7	0.94	0	1	0
Notional	287	0	102.2	0	21.3	0.78	0	----	----
[ST] Central heating using air distribution, [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	691.6	0	175.4	0	69.9	1.1	0	1	0
Notional	824.1	0	293.5	0	13	0.78	0	----	----
[ST] Central heating using air distribution, [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	385.6	0	104.7	0	61.1	1.02	0	1	0
Notional	484.5	0	172.5	0	13	0.78	0	----	----
[ST] Constant volume system (fixed fresh air rate), [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	132.8	116.6	28.5	16.3	186.5	1.29	1.99	1	4.15
Notional	555.6	98.7	185.9	16.4	62.9	0.83	1.67	----	----
[ST] Central heating using water: radiators, [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	111.4	0	33	0	17.6	0.94	0	1	0
Notional	407.5	0	145.1	0	20.7	0.78	0	----	----
[ST] Central heating using water: radiators, [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	35.9	0	10.6	0	2.3	0.94	0	1	0
Notional	89.8	0	34.2	0	2.3	0.73	0	----	----
[ST] Central heating using water: radiators, [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	67.6	0	20	0	2	0.94	0	1	0
Notional	117	0	44.5	0	2	0.73	0	----	----

Technical Data Sheet (Actual vs. Notional Building) (cont.)

HVAC Systems Performance (cont.)

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat kWh/m2	Cool kWh/m2	Aux kWh/m2	Heat SSEFF	Cool SSEER	Heat G SEFF	Cool G SEER
[ST] Active chilled beams, [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	26.5	401.9	8	32.5	26.7	0.92	3.44	1	4.15
Notional	383	215.3	128.2	35.8	58.7	0.83	1.67	----	----
[ST] Central heating using water: radiators, [HS] District heating, [HFT] Biomass, [CFT] Grid Supplied Electricity									
Actual	25.3	0	7.5	0	16.2	0.94	0	1	0
Notional	148.4	0	52.8	0	11.7	0.78	0	----	----

Key to terms

Alpha value (%)	= percentage of the building's average heat transfer coefficient which is due to thermal bridging
Heat dem (MJ/m2)	= Heating energy demand
Cool dem (MJ/m2)	= Cooling energy demand
Heat con (kWh/m2)	= Heating energy consumption
Cool con (kWh/m2)	= Cooling energy consumption
Aux con (kWh/m2)	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type